

Total Maximum Daily Load (TMDL) In Relation To Soils and NRCS Mapping and Databases

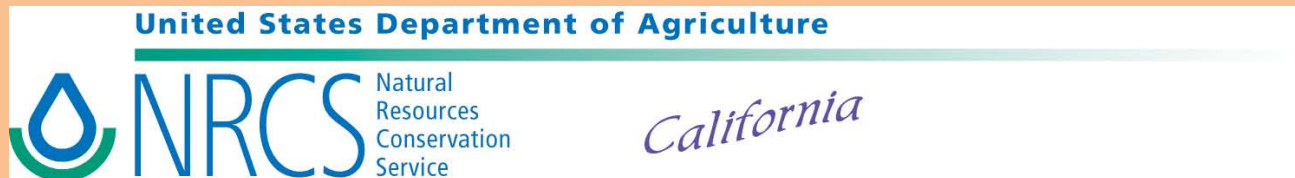
Management Tools

Presented To
California Water Plan

December 12, 2011

Sidney W. Davis

Assistant State Soil Scientist



From Where Does The 'Load' Come?

- Natural weathering of bedrock into sand, silt and clay (soil)
 - Heat, freezing, abrasion, corrosion
- Denudation
 - Fire
 - Deforestation
 - Drought
 - Mechanical
- Transport
 - Gravity
 - Suspension
 - Dissolution
 - Glacial Advance / Retreat
 - Streams / Rivers / Lakes / Oceans

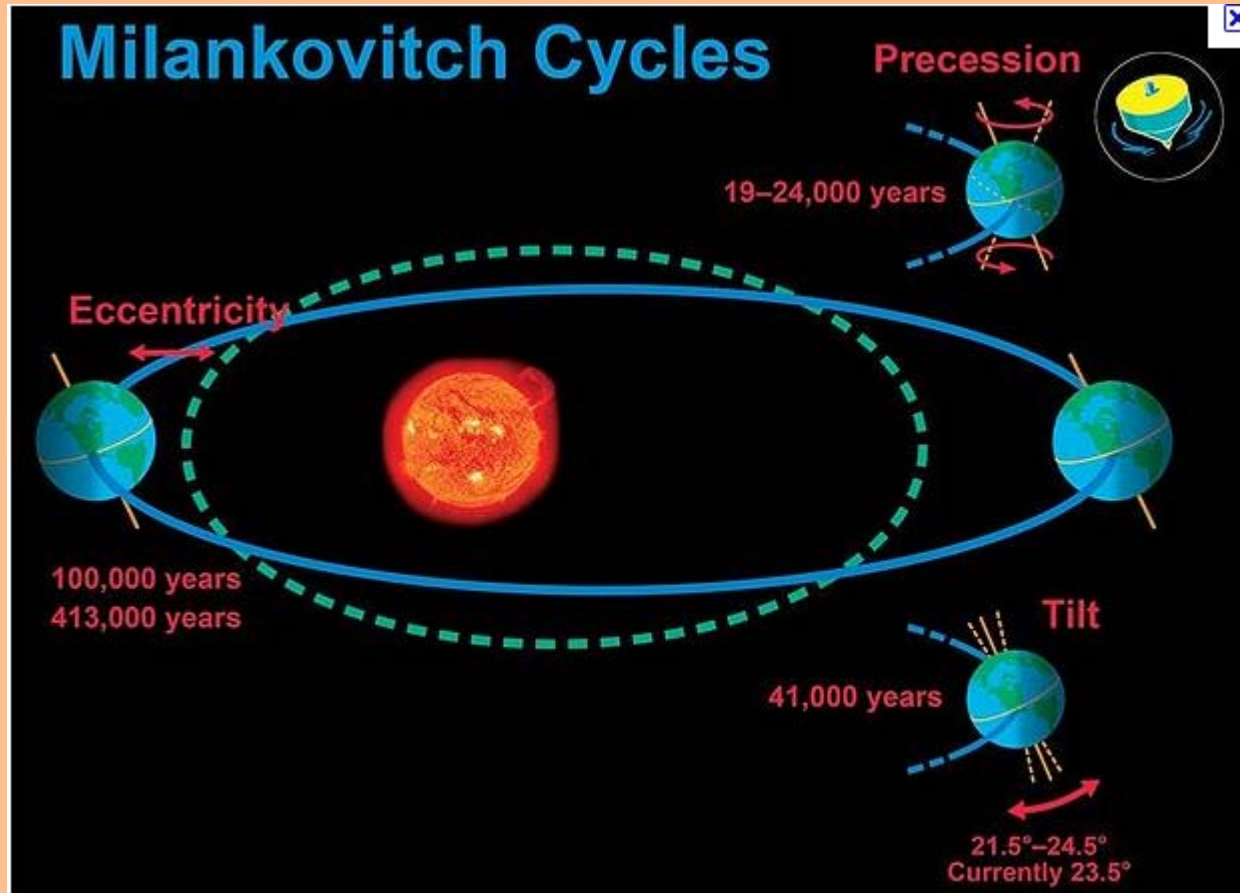
Major Contributing Factors

- Natural Processes
 - Earth orbit variations (Glacial-Interglacial)
 - Sea Temperature Fluctuations (Pacific Decadal Oscillation)
 - Cyclonic Storm Events (Nino Index)
 - Seismic Activity (Regional Uplift - Tsunami)
- Runoff
 - Natural Environments
 - Cultural Improvement
 - Urban Development
 - Infrastructure
 - Water supply and treatment
 - Agriculture / Forestry / Mining / Manufacturing

Events

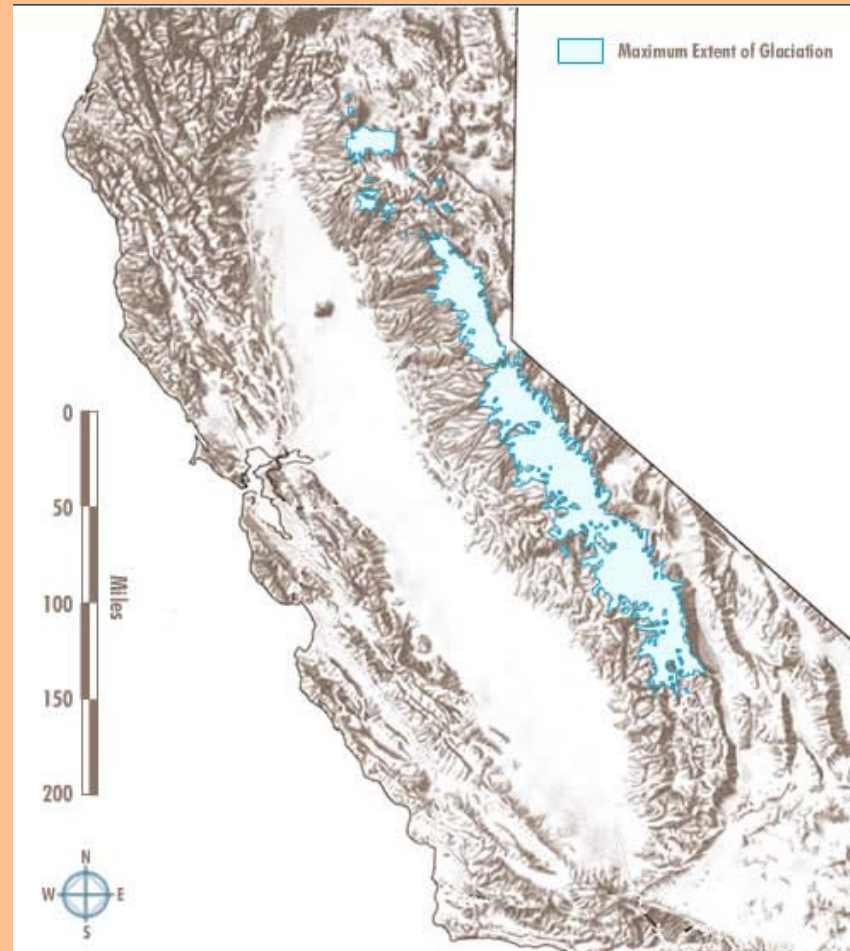
- Average processes are imperceptible
- Materials generally move in 'Pulses', 'Slugs' or so called 'Major Events'
- Long duration Events – Glacial (20 - 400 ka cycles)
- One-time Events:
 - 100 – Year Storms
 - Hurricanes / Typhoons
 - Earthquake / Tsunami

Wobbles and Eccentricities in Earth's Orbit



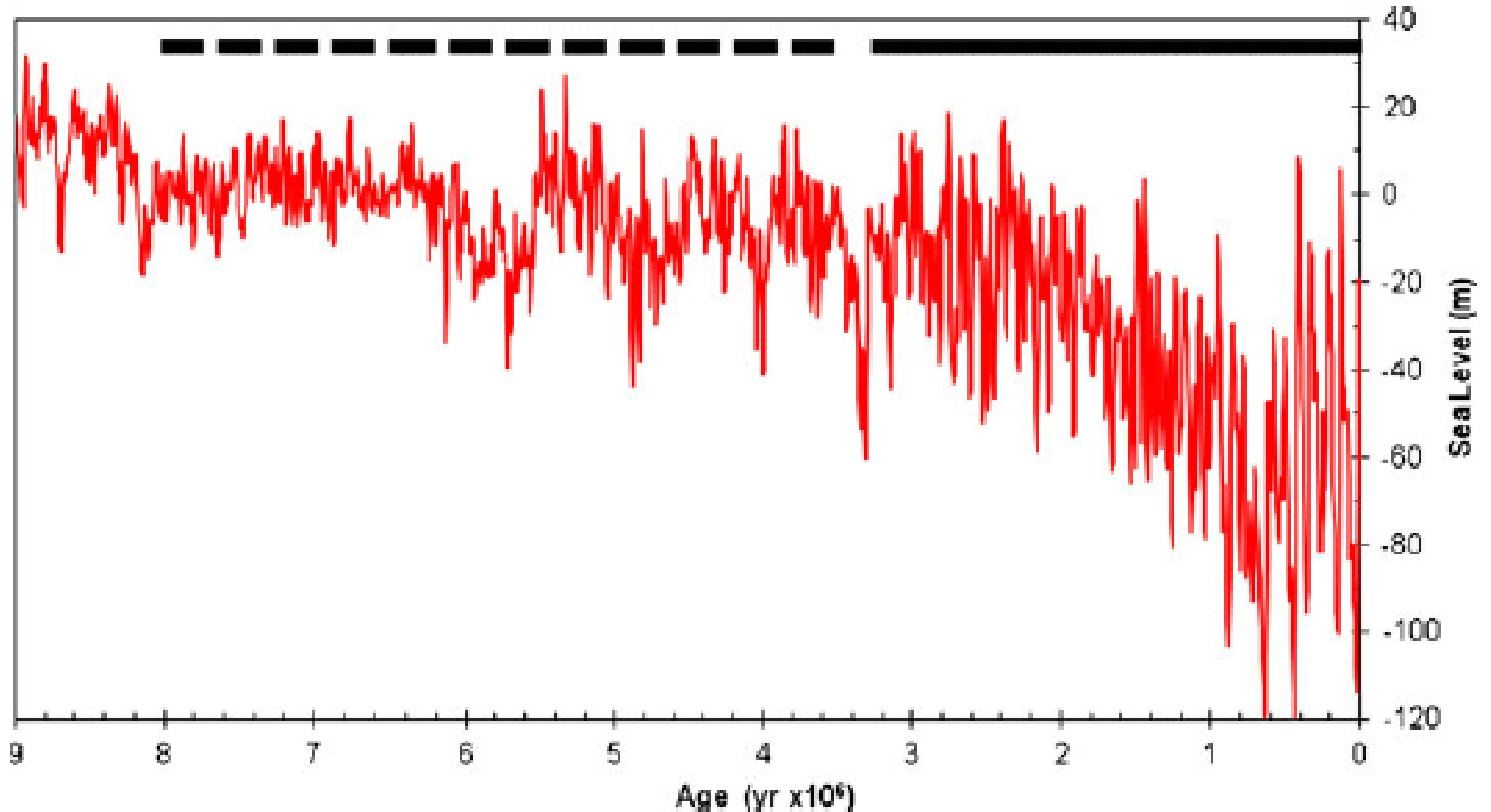
Maximum Extent of Glaciation Sierra Nevada

(Guyton, 1998)



Sea Level Changes

Donoghue, 2011

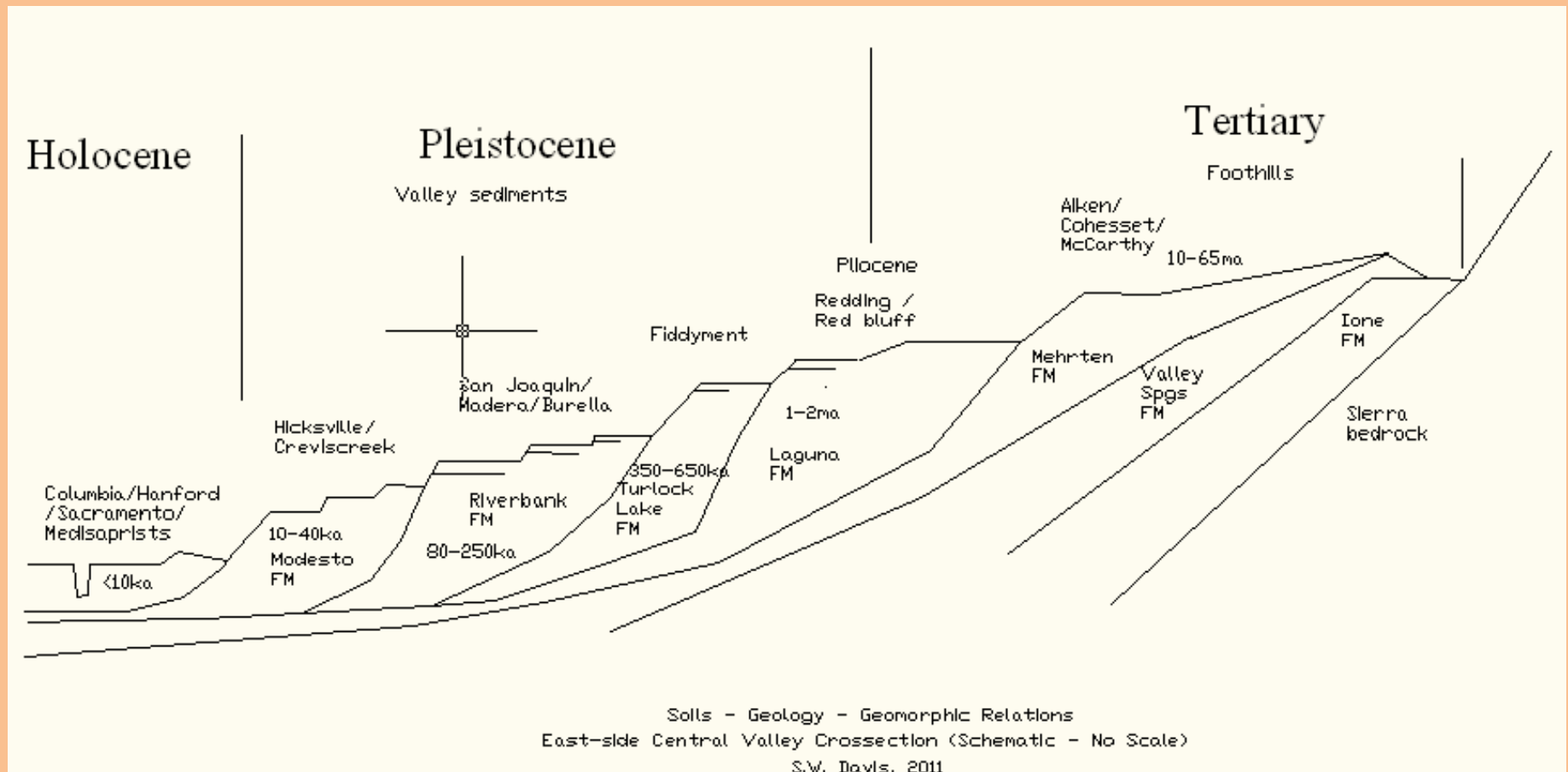


Based on benthic marine isotope data

San Onofre State Beach

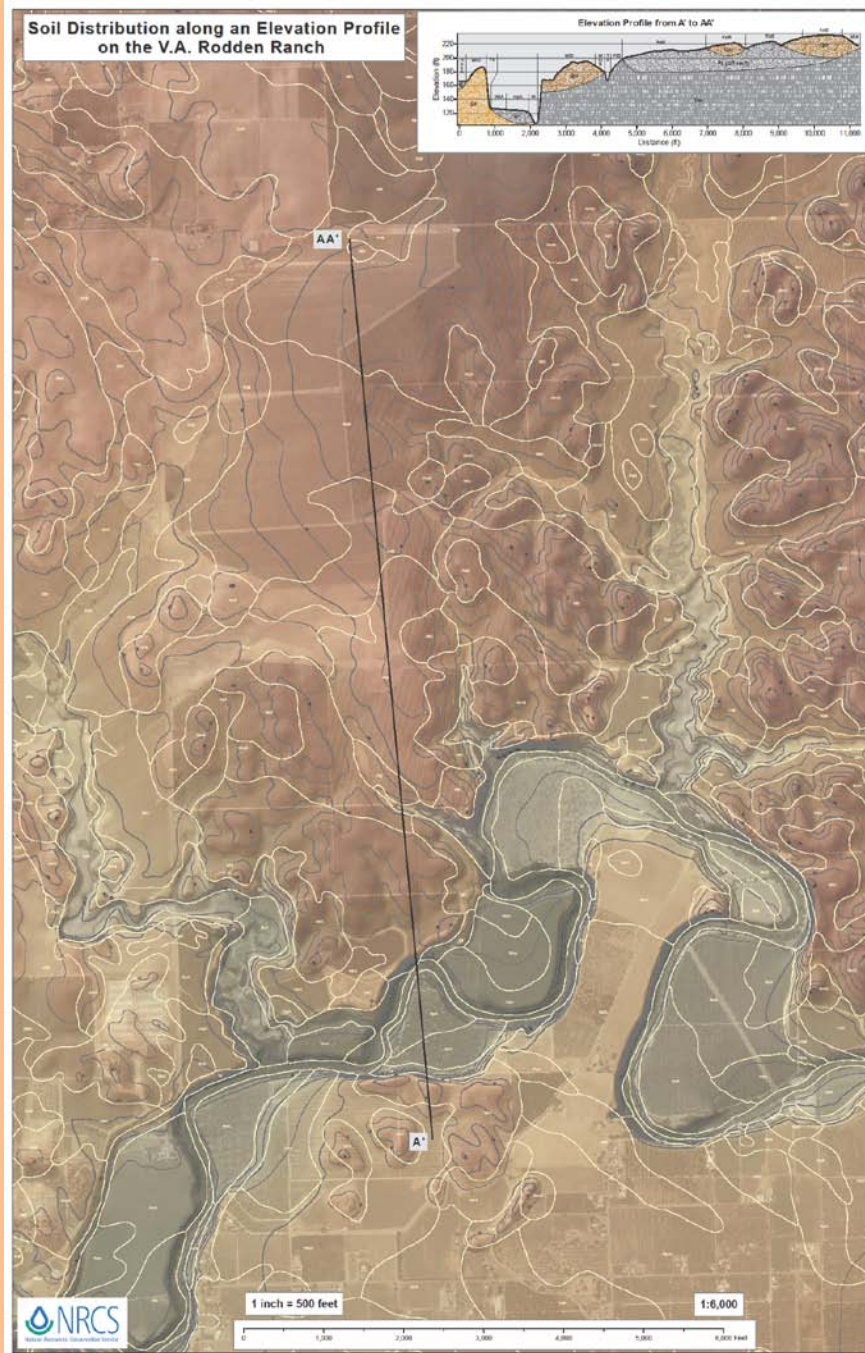


Terrace Sets – Eastern Sacramento Valley

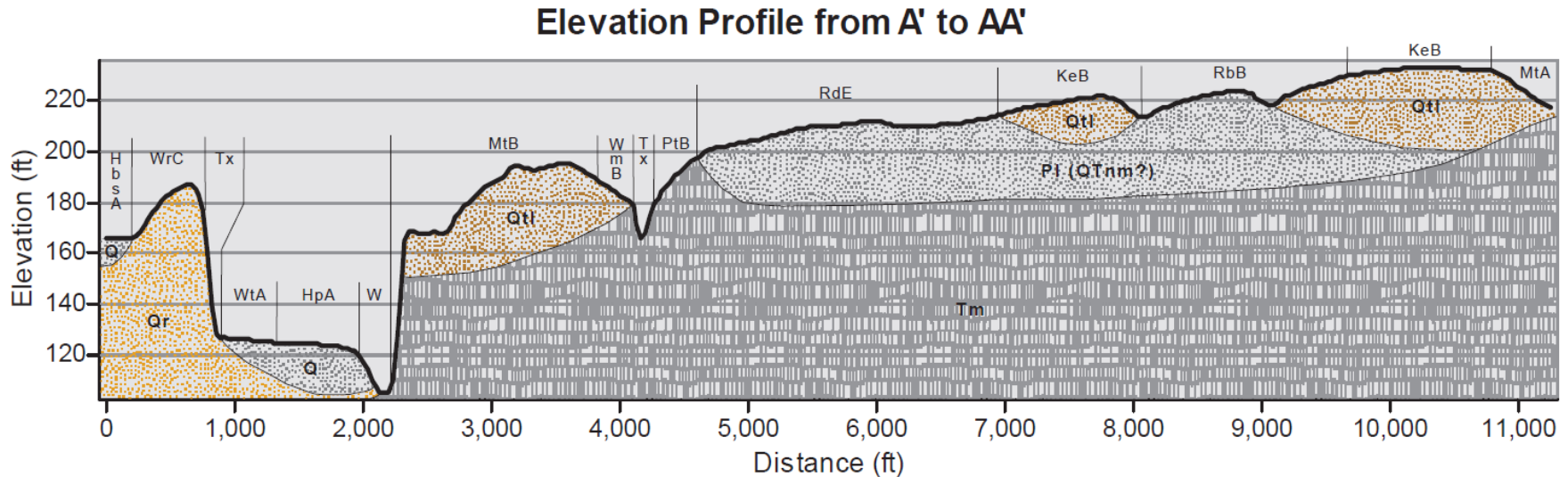


Pleistocene and younger deposits are in response to climatic change

Soils Map of a typical area of Eastern Stanislaus County



Crossection of Deposits in Relation to Soils



Geology

Q – Recent alluvium
Qr – Riverbank FM
Qtl – Turlock lake FM
Pl – Laguna FM
Tm – Mehrten FM

Soils

HpA (Hanford), WtA (Wymn)
WrC (Whitney)
MtB (Montpellier)
RdE (Redding)
PtB (Peters)

Sendai, Japan



April 4, 2010

Source: NY Times

Sendai, Japan post Tsunami

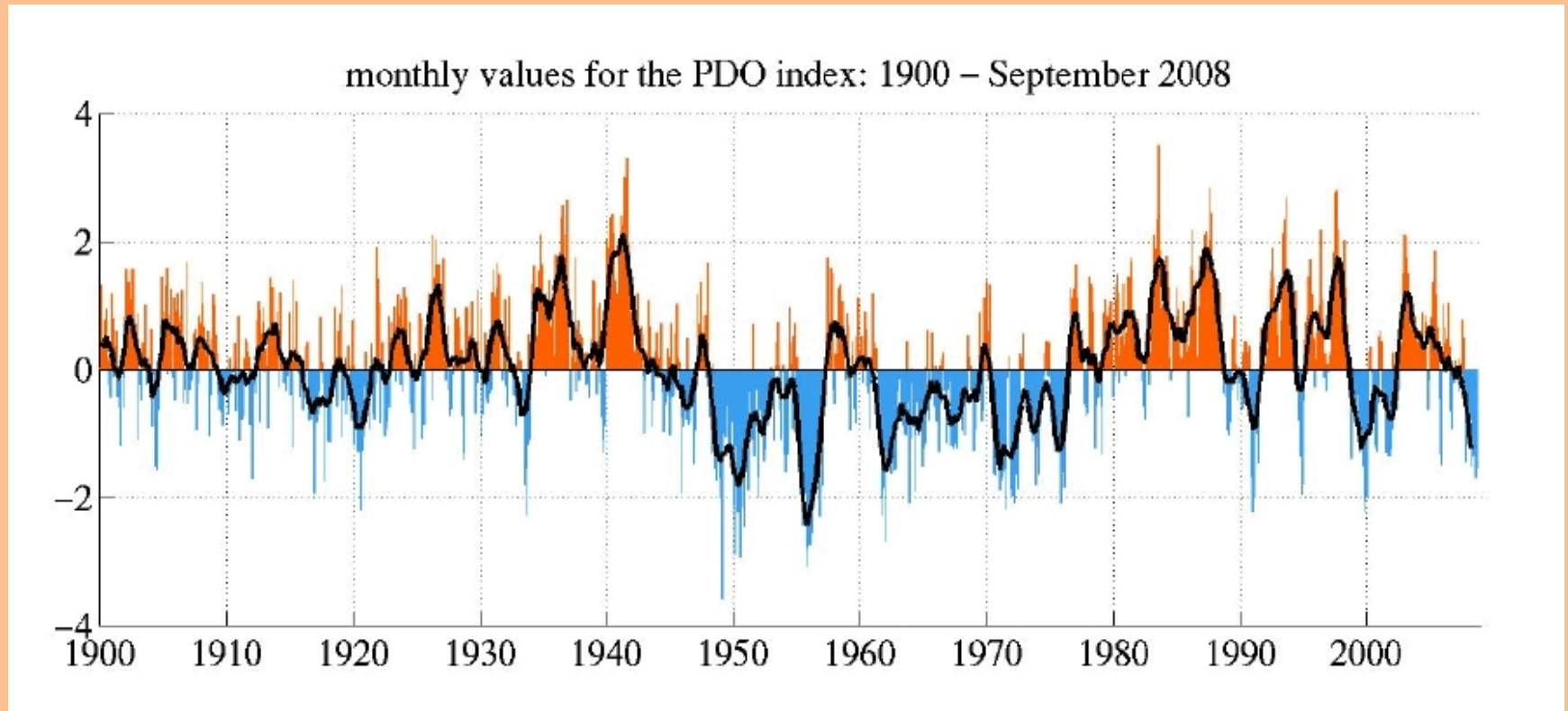


March 12, 2011

Source: NY Times

Pacific Decadal Oscillation (PDO)

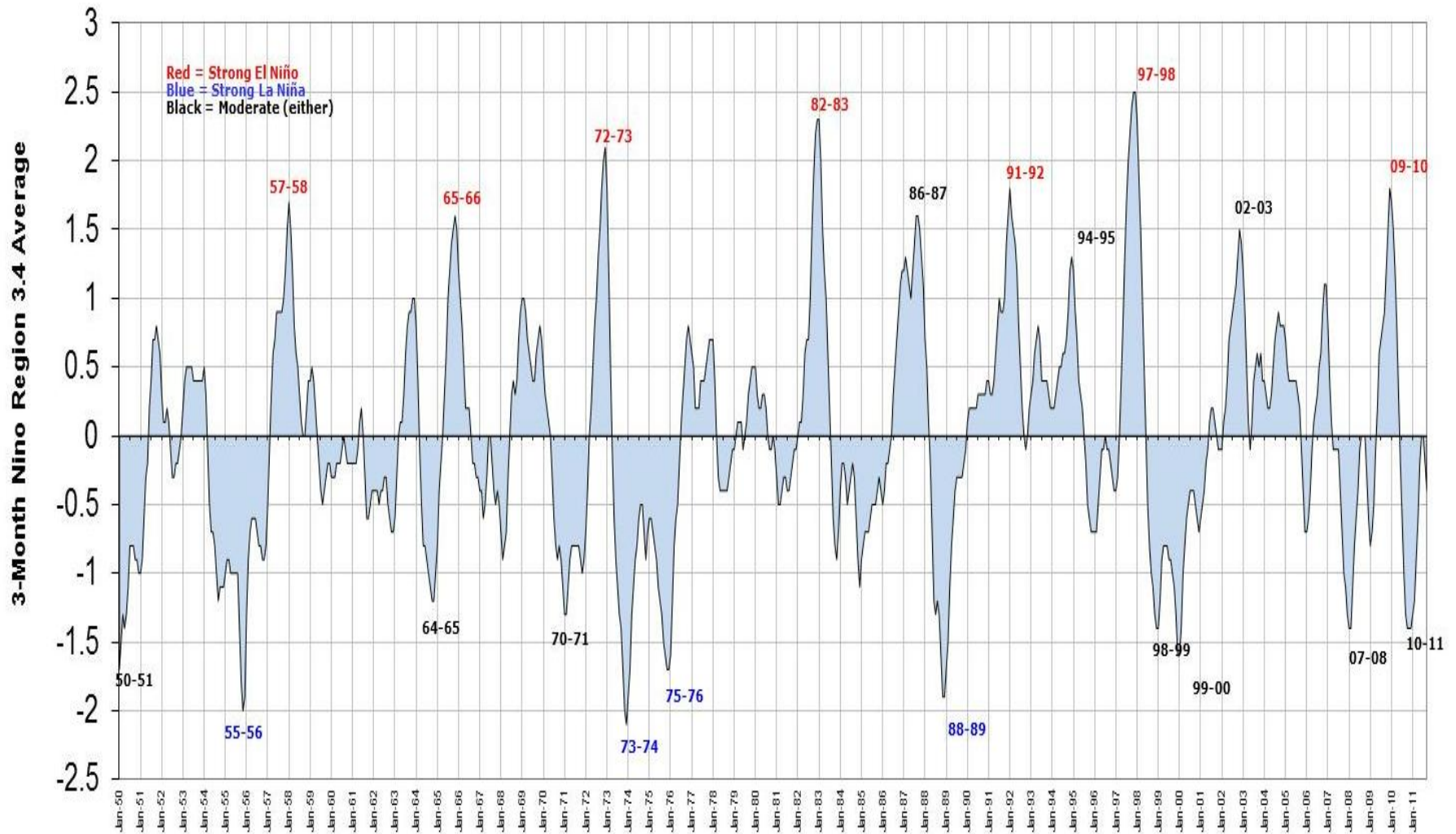
(Nate Mantua and others, 1996)



Monthly Values for the PDO Index, January 1900 to September 2008. Positive (**red**) index values indicate a warm phase PDO; negative (**blue**) index values indicate a cool phase PDO. While short-term flips in PDO phases do occur, evaluation of 20th century instrumental records has shown that PDO phases generally persist for 20-30 years, as indicated in this figure.

Oceanic Niño Index (ONI)

http://www.cpc.noaa.gov/products/analysis_monitoring/ensostuff/ens



Running 3-Month Mean ONI values

El Niño (Warm) / La Niña (Cool)

El Niño			La Niña		
Weak	Mod	Strong	Weak	Mod	Strong
1951	1986	1957	1950	1954	1955
1963	1987	1965	1956	1964	1973
1968	1994	1972	1962	1970	1975
1969	2002	1982	1967	1998	1988
1976		1991	1971	1999	
1977		1997	1974	2007	
2004		2009	1984	2010	
2006			1995		
			2000		

1986 Event



Improperly designed reservoir – lacking spillway

1986 Event



Under-sized culvert

1986 Event



Mass wasting -lateral groundwater flow out of cut bank

1997 storm event – S. Fork American River



American River overbank at Coloma, 1997



Residential Flooding



Coloma, CA 1997

Sheet Erosion



Rill Erosion



Seed and mulch cut slopes after construction



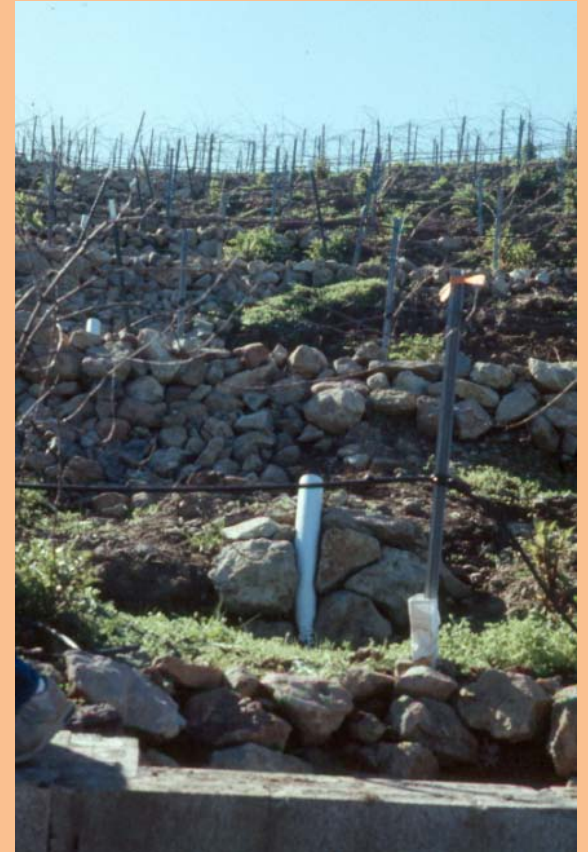
Maintain cover crops



Terrace steep slopes and maintain cover crop

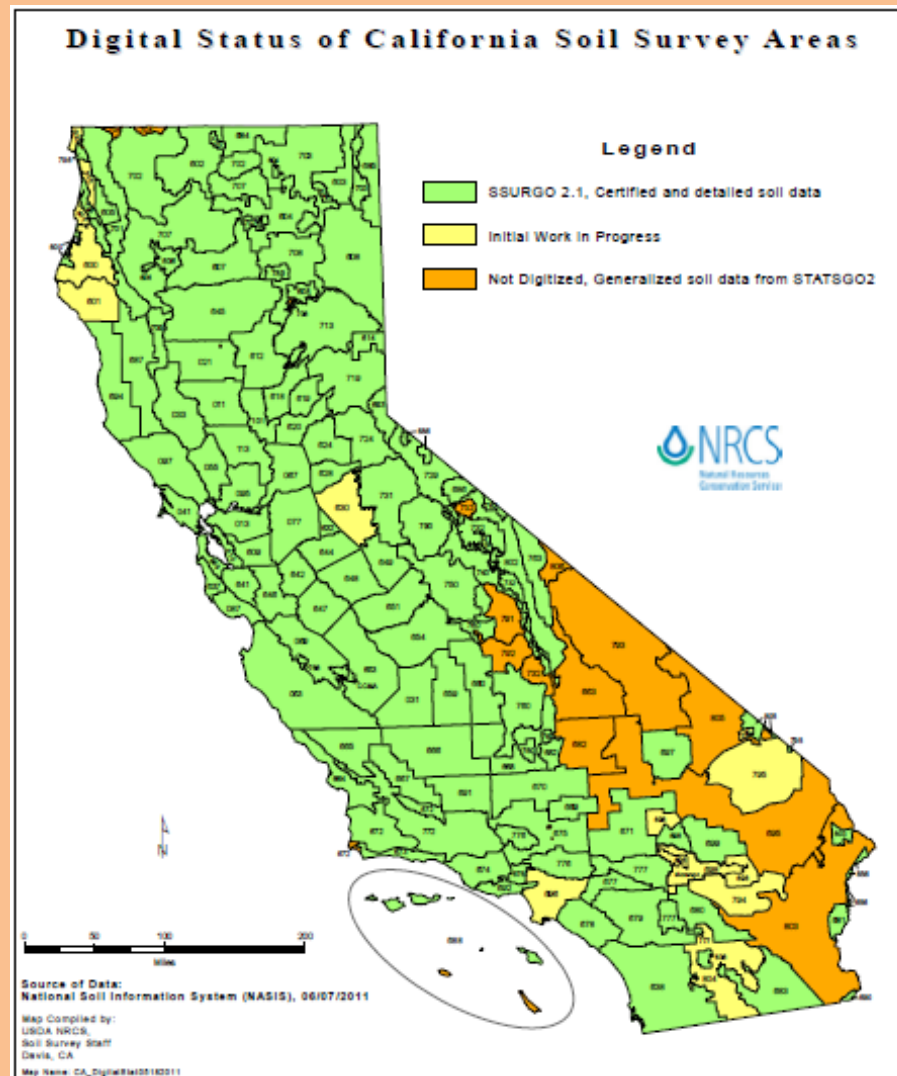


Engineering and drainage
may be required



Digital Soil Mapping Status

June, 2011



Digital Data Available

- Soil Data Mart
- Geospatial Data Gateway
- Soil Data Viewer (GIS)
- Web Soil Survey
- Soil Web App for Smart Phone (UCD – NRCS)



soil data mart



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Davis, CA

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Related searches

More search tools

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soildatamart.nrcs.usda.gov/

USDA-NRCS **Soil Data Mart** Home page provides information for using the **Soil Data Mart**.

[Select State](#)

USDA-NRCS **Soil Data Mart** State page is the starting ...

[Template Databases](#)

USDA-NRCS **Soil Data Mart** Template Database ...

[SSURGO Metadata.](#)

USDA-NRCS **Soil Data Mart** SSURGO Metadata page ...

[Soil Data Mart - Select Soil ...](#)

USDA-NRCS **Soil Data Mart** Survey page allows the user ...

[US General Soil Map.](#)

USDA-NRCS **Soil Data Mart** U.S. General Soil Map page ...

[Help.](#)

USDA-NRCS **Soil Data Mart** Help page provides help for ...

[More results from usda.gov »](#)

[Web Soil Survey - Home](#)

websoilsurvey.nrcs.usda.gov/

Apr 12, 2011 – NCSS. Archived Soil Surveys. Status Maps. Official Soil Series Descriptions. Soil Series Extent Mapping Tool. **Soil Data Mart**. Geospatial Data ...

[NRCS Soils](#)

soils.usda.gov/

Nov 15, 2011 – **Soils** is part of the National Cooperative **Soil** Survey, an effort of ... **GlobalSoilMap** .net is a global consortium that has been formed with the aim ...

Select CA

Soil Data Mart - Select State or Territory.

United States Department of Agriculture
NRCS Natural Resources Conservation Service

Home Select State State Contacts Template Databases SSURGO Metadata Status Map US General Soil Map

Soil Data Mart
Logon/Registration

Please select a state or territory with at least one survey area:

State or Territory Code	State or Territory Name	Available Survey Areas
AL	Alabama	67
AK	Alaska	28
AZ	Arizona	53
AR	Arkansas	66
CA	California	112
CO	Colorado	68
CT	Connecticut	1
DC	District of Columbia	1
DE	Delaware	3
FL	Florida	70
GA	Georgia	95
HI	Hawaii	8
ID	Idaho	55
IL	Illinois	102
IN	Indiana	92
IA	Iowa	99
KS	Kansas	105
KY	Kentucky	85
LA	Louisiana	64
ME	Maine	17
MD	Maryland	25
MA	Massachusetts	19

Select County

Select Survey Area

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Select County

Soil Data Mart - Select County or Parish.

United States Department of Agriculture
NRCS Natural Resources Conservation Service

California

Soil Data

Home Select State State Contacts Template Databases SSURGO Metadata Status Map US General Soil Map Logon/Register

Please select a county or parish with at least one survey area:

County Code	County Name	Available Survey Areas
CA041	Marin	1
CA043	Mariposa	4
CA045	Mendocino	3
CA047	Merced	2
CA049	Modoc	5
CA051	Mono	5
CA053	Monterey	2
CA055	Napa	1
CA057	Nevada	2
CA059	Orange	1
CA061	Placer	4
CA063	Plumas	5
CA065	Riverside	8
CA067	Sacramento	1
CA069	San Benito	2
CA071	San Bernardino	13
CA073	San Diego	2
CA075	San Francisco	1
CA077	San Joaquin	1
CA079	San Luis Obispo	4

Select State Select Survey Area

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Add in an email address

United States Department of Agriculture
NRCS Natural Resources Conservation Service

CA067 - Sacramento County, California
Sacramento County
California

Soil Data Mart
Logon / Register Help

Home Select State State Contacts Template Databases SSURGO Metadata Status Map US General Soil Map

Please select the class of data you wish to download: (Survey Area Version 10 , Tabular Version 7 , Spatial Version 2)

☐ Tabular Data Only ☒ Tabular and Spatial Data ☐ Spatial Data Only ☐ Template Database Only

Please select a spatial format:
AroView Shapefile

Please select a coordinate system:
UTM Zone 10, Northern Hemisphere (NAD 83)

Reset Default

Please select a template database (optional):

	State	MS Access Version	Template DB Version	Template DB Name	Size	
	US	Access 2002	33.2	soildb_NPS_2002	2.4M	▲
	US	Access 97	32	soildb_US_97	1.4M	▲
	AK	Access 2002	32.15	soildb_AK_2002	2.5M	▲
▶	CA	Access 2002	33.2	soildb_CA_2003	1.8M	▼

Description:
"This is the California version of the SSURGO template for Microsoft Access 2002 or 2003. This database should be used for all California soil survey areas.
This template includes the following locally developed reports:
Brief Soil Descriptions (CA)
Hydric Soils (CA)

Please enter your e-mail address:

If the e-mail account entered above is protected by spam blocking software, you will need to authorize e-mail from SoilDataMart@nrcs.usda.gov in order to receive e-mail notification once your request has been processed.

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Soil Data Viewer

[Soil Data Viewer | NRCS Soils](#)

soils.usda.gov/sdv/

Aug 5, 2011 – **Soil Data Viewer** is a tool built as an extension to ArcMap that allows a user to create soil-based thematic maps. The application can also be ...

[Download and Install Soil Data ...](#)

Download and Install **Soil Data Viewer**. Download **Soil Data ...**

[Download and Install Soil Data ...](#)

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[Download and Install Soil Data ...](#)

If you need to obtain **Soil Data Viewer** 5.0 for a USDA CCE ...

[Download and Install Soil Data ...](#)

If you need to obtain **Soil Data Viewer** 5.1 for a USDA CCE ...

[Download and Install Soil Data ...](#)

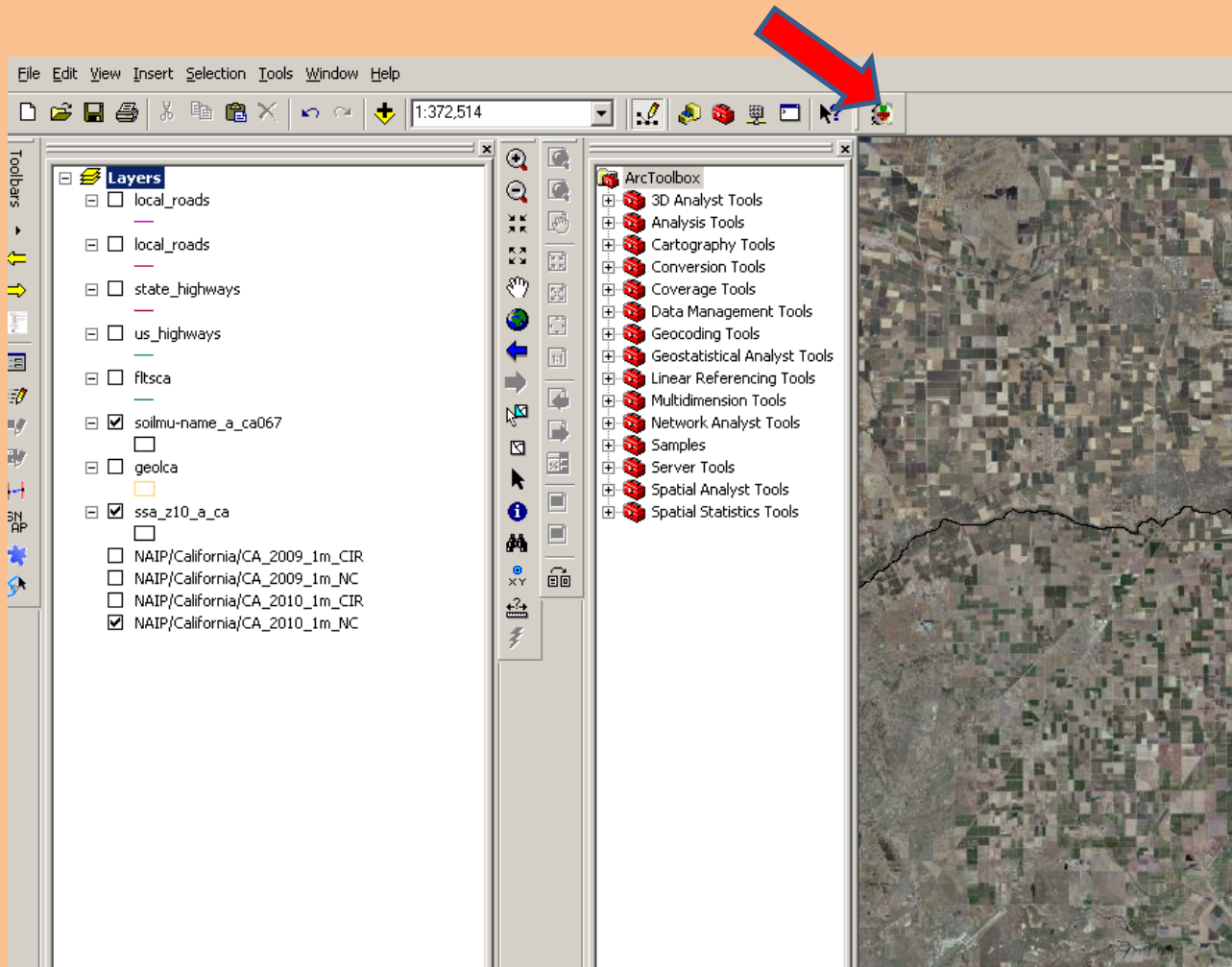
This page allows you to download **Soil Data Viewer** ...

[Online User Guides | NRCS ...](#)

Online User Guides. These documents require Acrobat ...

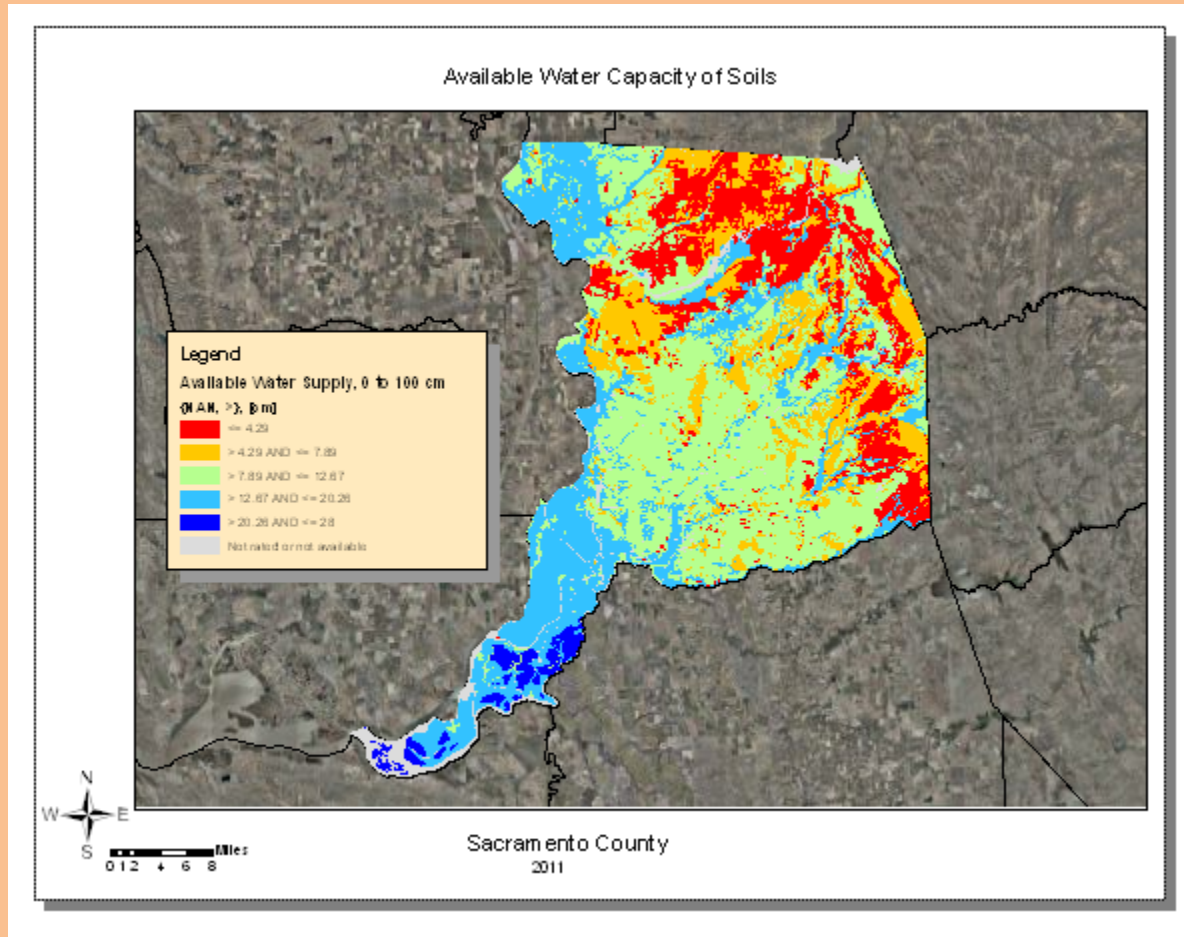
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Soil Data Viewer, ESRI Format

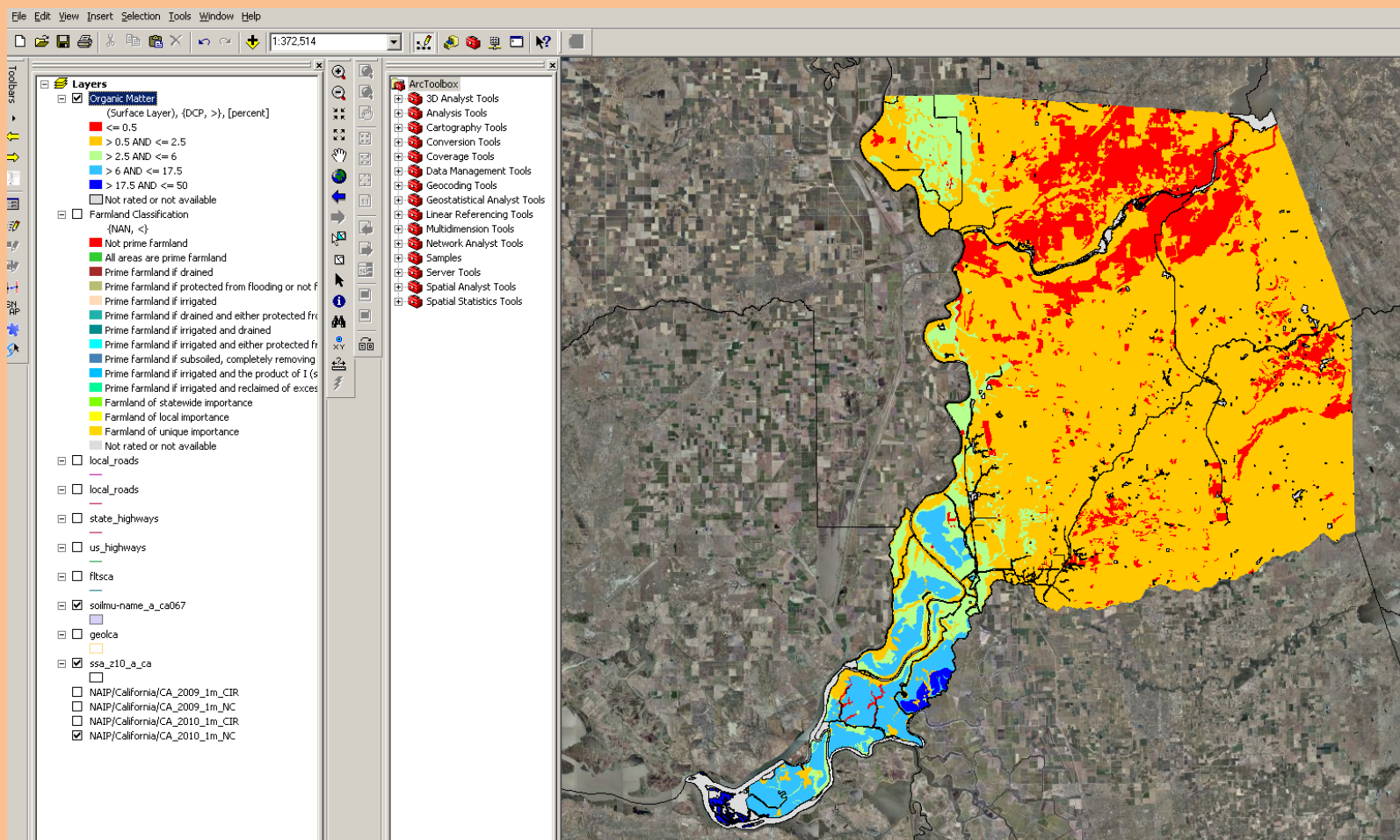


Soil Data View – Sacramento County

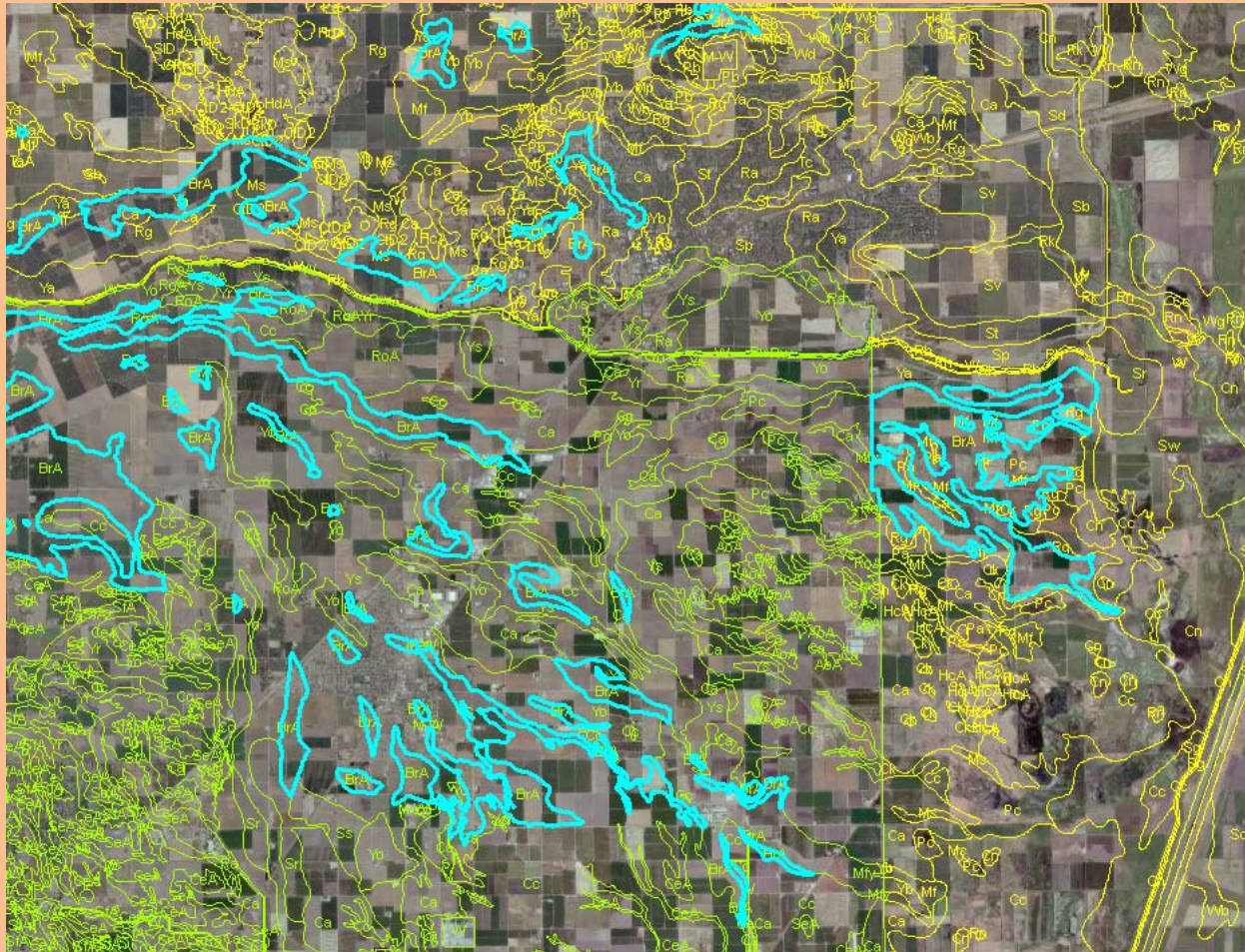
Available Water Capacity of Soils



Sacramento County – Organic Matter

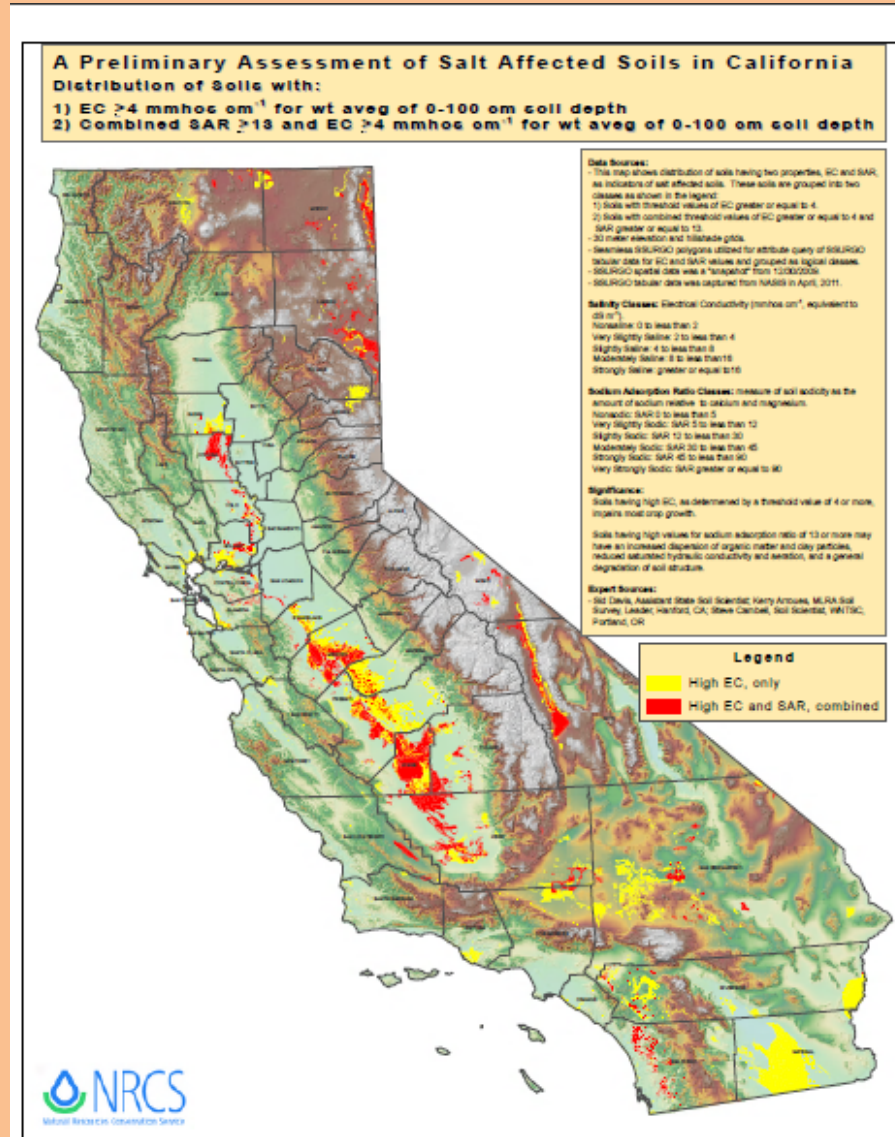


Brentwood soils mapped in Yolo and Solano Counties



Salinity Map

- Data is a 'snapshot' in time.
- Chemical – solutes are mobile and can change rapidly.
- Salts do trend toward low landscape position.



Web Soil Survey



The screenshot shows the USDA Web Soil Survey homepage. At the top, there is a banner with the USDA logo, the text "United States Department of Agriculture" and "Natural Resources Conservation Service", and a large yellow "Web Soil Survey" title. Below the banner is a navigation bar with links: Home, About Soils, Help, and Contact Us. A red arrow points from the "Web Soil Survey" title to a green circular button labeled "START WSS".

Search

Enter Keywords

All NRCS Sites

Browse by Subject

- Soils Home
- National Cooperative Soil Survey (NCSS)
- Archived Soil Surveys
- Status Maps
- Official Soil Series Descriptions (OSD)
- Soil Series Extent Mapping Tool
- Soil Data Mart
- Geospatial Data Gateway
- eFOTG
- National Soil Characterization Data
- Soil Geochemistry Spatial Database
- Soil Quality
- Soil Geography
- Geospatial One Stop

You are here: Web Soil Survey

The simple yet powerful way to access and use soil data.

Welcome to Web Soil Survey (WSS)

Web Soil Survey (WSS) provides soil data and information produced by the National Cooperative Soil Survey. It is operated by the USDA Natural Resources Conservation Service (NRCS) and provides access to the largest natural resource information system in the world. NRCS has soil maps and data available online for more than 95 percent of the nation's counties and anticipates having 100 percent in the near future. The site is updated and maintained online as the single authoritative source of soil survey information.

Four Basic Steps

- 1 Define...
Area of Interest (AOI)
Use the Area of Interest tab to define your area of interest.



Click to view larger image.

I Want To...

- Start Web Soil Survey (WSS)
- Know the requirements for running Web Soil Survey — will Web Soil Survey work in my web browser?
- Know the Web Soil Survey hours of operation
- Find what areas of the U.S. have soil data



Announcements/Events

- Web Soil Survey 2.3 has been released! View description of new features.
- Web Soil Survey Release History

I Want Help With...

- How to use Web Soil Survey
- How to use Web Soil Survey Online Help
- Known Problems and Workarounds
- Frequently Asked Questions
- Citing Web Soil Survey

Web Soil Survey

 Web Soil | survey 

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websoilsurvey.nrcs.usda.gov/
Apr 12, 2011 – The Natural Resources Conservation Service is the Federal agency that works in partnership with the American people to conserve and sustain ...

[List of Soil Surveys by State](#)
This **Web** site lists **soil surveys** that have been published by ...

[National Soil Characterization ...](#)
National Cooperative Soil Survey Soil Characterization ...

[Official Soil Series ...](#)
Official Soil Series Descriptions (OSD) with series extent ...

[Requirements](#)
Web Soil Survey has been tested on the following ...

[Soil Geography](#)
Soil Geography. PDF files require Acrobat Reader. ...

[About Us](#)
About NRCS Soils. Soil Survey Division - responsibilities. ...

[More results from usda.gov »](#)

Davis, CA

Change location

Show search tools

[Soil Survey Contents | NRCS Soils](#)
soils.usda.gov/survey/
Online **Web Soil Survey** - Official USDA soil information as viewable maps and tables for more than ... **Web Soil Survey** Brochure (July 2011) (PDF; 3.15 MB) ...

[Web Soil Survey](#)
www.dnr.state.oh.us/LinkClick.aspx?link=19387&tabid=9051
Web Soil Survey. Basic functionality of the **Web Soil Survey**. Allows the user to view the soils of the area of interest. Allows the user to select differing soil ...

Select State

USDA United States Department of Agriculture
Natural Resources Conservation Service

Web Soil Survey

Contact Us | Download Soils Data | Archived Soil Surveys | Soil Survey Status | Glossary | Preferences | Link | Logout | Help

Area of Interest (AOI) | Soil Map | Soil Data Explorer | Shopping Cart (Free)

Search

Area of Interest

Import AOI

Quick Navigation

Address

State and County

Soil Survey Area

Latitude and Longitude

PLSS (Section, Township, Range)

Bureau of Land Management

Department of Defense

Forest Service

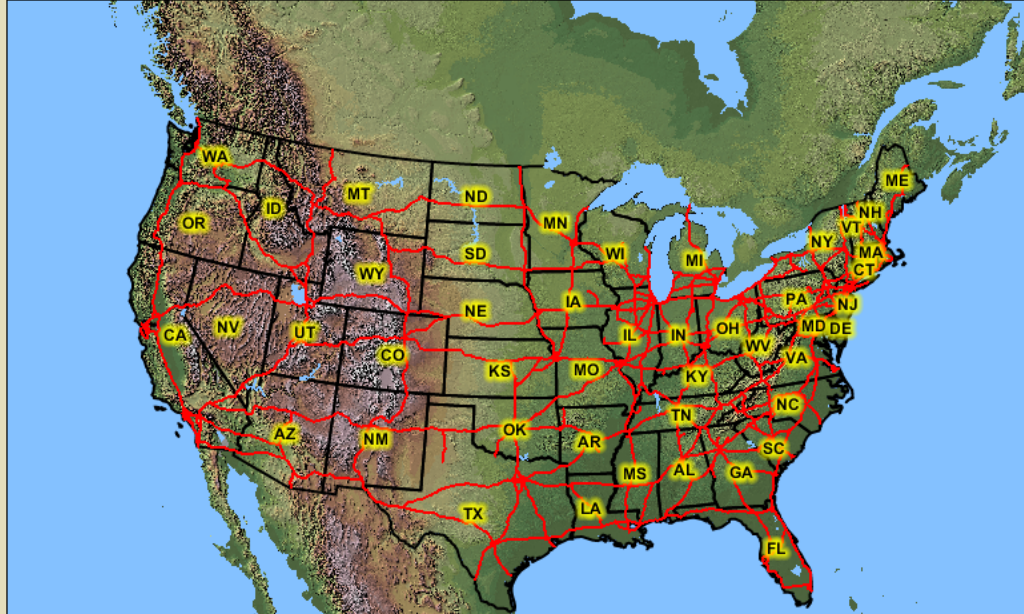
National Park Service

Hydrologic Unit

Area of Interest Interactive Map

View Extent: Contiguous U.S.

Scale: (not to scale)



Select State and Soil Survey Area

The image shows the USDA Web Soil Survey web application. At the top, the USDA logo and 'Natural Resources Conservation Service' are visible. A navigation bar includes links like 'Contact Us', 'Download Soils Data', 'Archived Soil Surveys', 'Soil Survey Status', 'Glossary', 'Preferences', 'Logout', and 'Help'. Below this, a tabbed interface shows 'Area of Interest (AOI)', 'Soil Map', 'Soil Data Explorer', and 'Shopping Cart (Free)'. The 'Area of Interest' tab is active, displaying the 'Area of Interest Interactive Map' section on the right and a search/navigation panel on the left. A red arrow points from the 'Area of Interest' tab to the map area. Another red arrow points from the 'Quick Navigation' section to the 'State' dropdown menu, which is set to 'California'. The 'County' dropdown is set to 'Sacramento', and the text 'Sacramento County, California' is displayed below it. The 'Show Soil Survey Areas Layer in Map' checkbox is unchecked. The map itself shows a topographic view of the Sacramento Valley region, with major highways (505, 80, 880) and cities (Sacramento, Yolo, Woodland, etc.) labeled. A legend is visible on the left side of the map area.

USDA United States Department of Agriculture
Natural Resources Conservation Service

Contact Us | Download Soils Data | Archived Soil Surveys | Soil Survey Status | Glossary | Preferences | Logout | Help

Area of Interest (AOI) | Soil Map | Soil Data Explorer | Shopping Cart (Free)

Area of Interest

Search

Area of Interest

Import AOI

Quick Navigation

State: California

County (from State): Sacramento

Sacramento County, California

Show Soil Survey Areas Layer in Map

Set AOI View

Latitude and Longitude

PLSS (Section, Township, Range)

Bureau of Land Management

Department of Defense

Forest Service

National Park Service

Hydrologic Unit

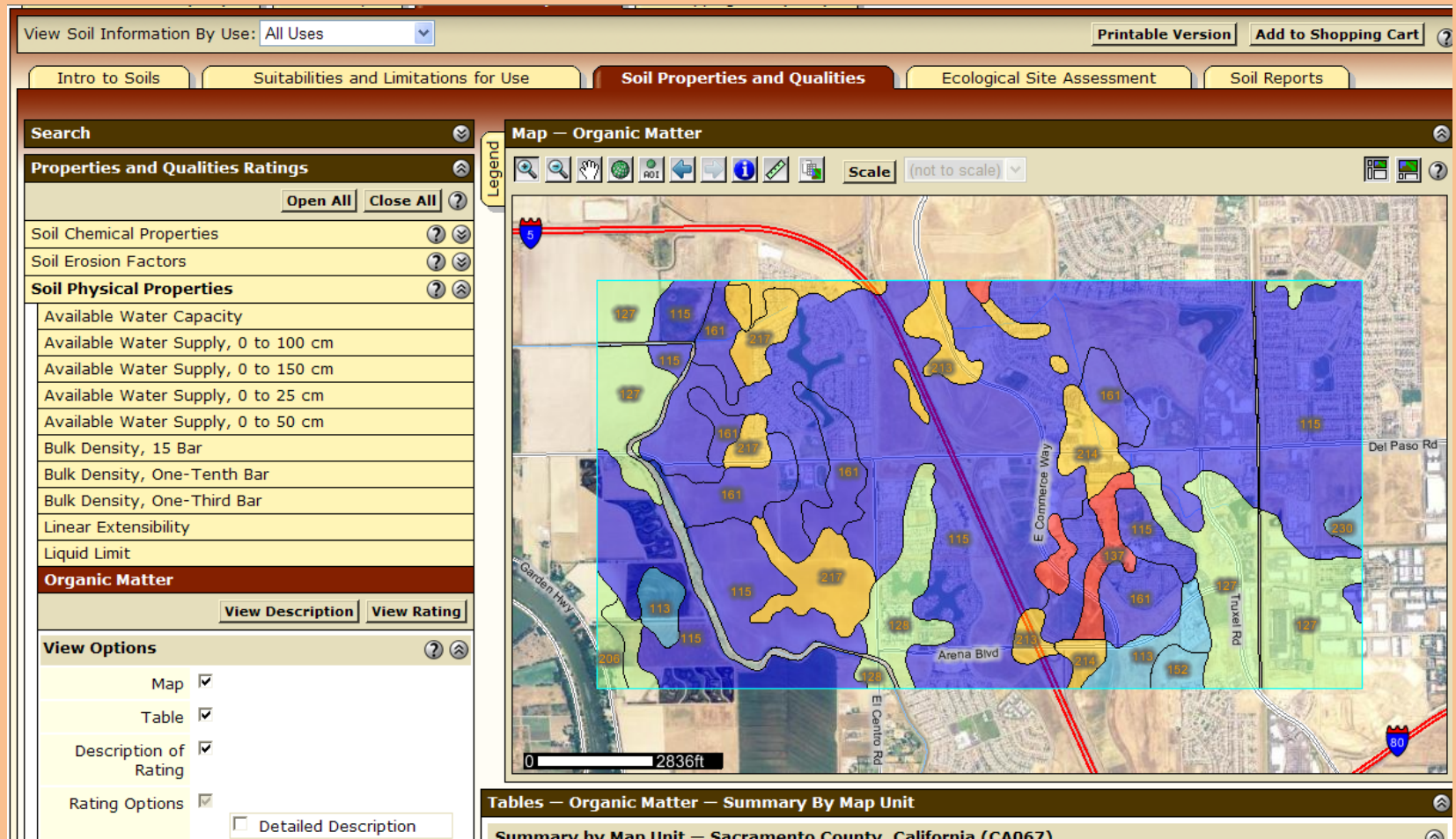
Area of Interest Interactive Map

View Extent: Contiguous U.S.

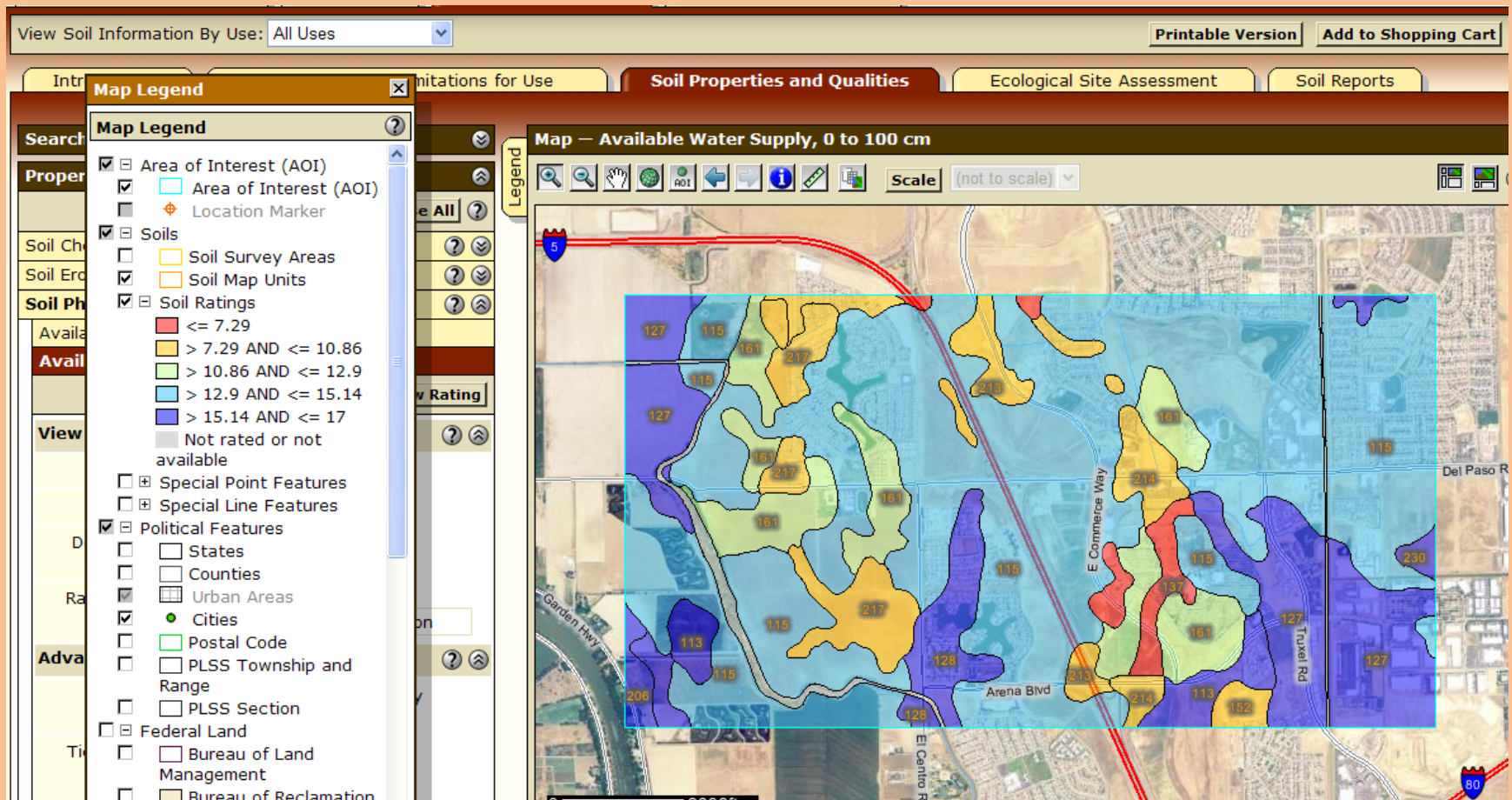
Scale: (not to scale)

Map showing Sacramento County, California, with major highways (505, 80, 880) and cities (Sacramento, Yolo, Woodland, etc.) labeled.

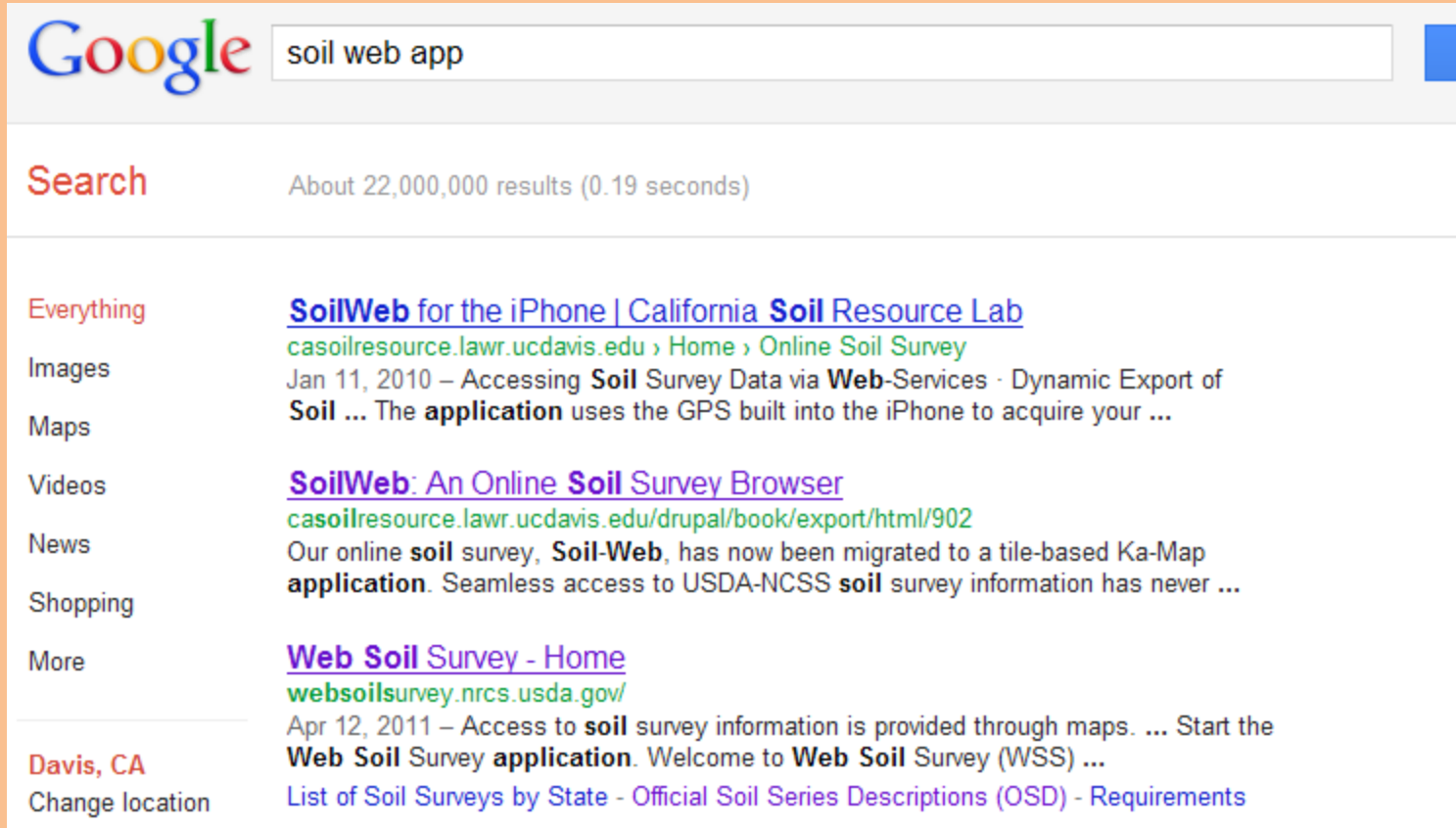
Organic Matter, Surface Horizon



Available Water Supply, 0 – 100 cm



Smart Phone App



Google soil web app

Search About 22,000,000 results (0.19 seconds)

Everything [SoilWeb for the iPhone | California Soil Resource Lab](#)
[casoilresource.lawr.ucdavis.edu > Home > Online Soil Survey](#)
Jan 11, 2010 – Accessing **Soil** Survey Data via **Web**-Services · Dynamic Export of **Soil** ... The **application** uses the GPS built into the iPhone to acquire your ...

Images

Maps

Videos [SoilWeb: An Online Soil Survey Browser](#)
[casoilresource.lawr.ucdavis.edu/drupal/book/export/html/902](#)
Our online **soil** survey, **Soil-Web**, has now been migrated to a tile-based Ka-Map **application**. Seamless access to USDA-NCSS **soil** survey information has never ...

News

Shopping

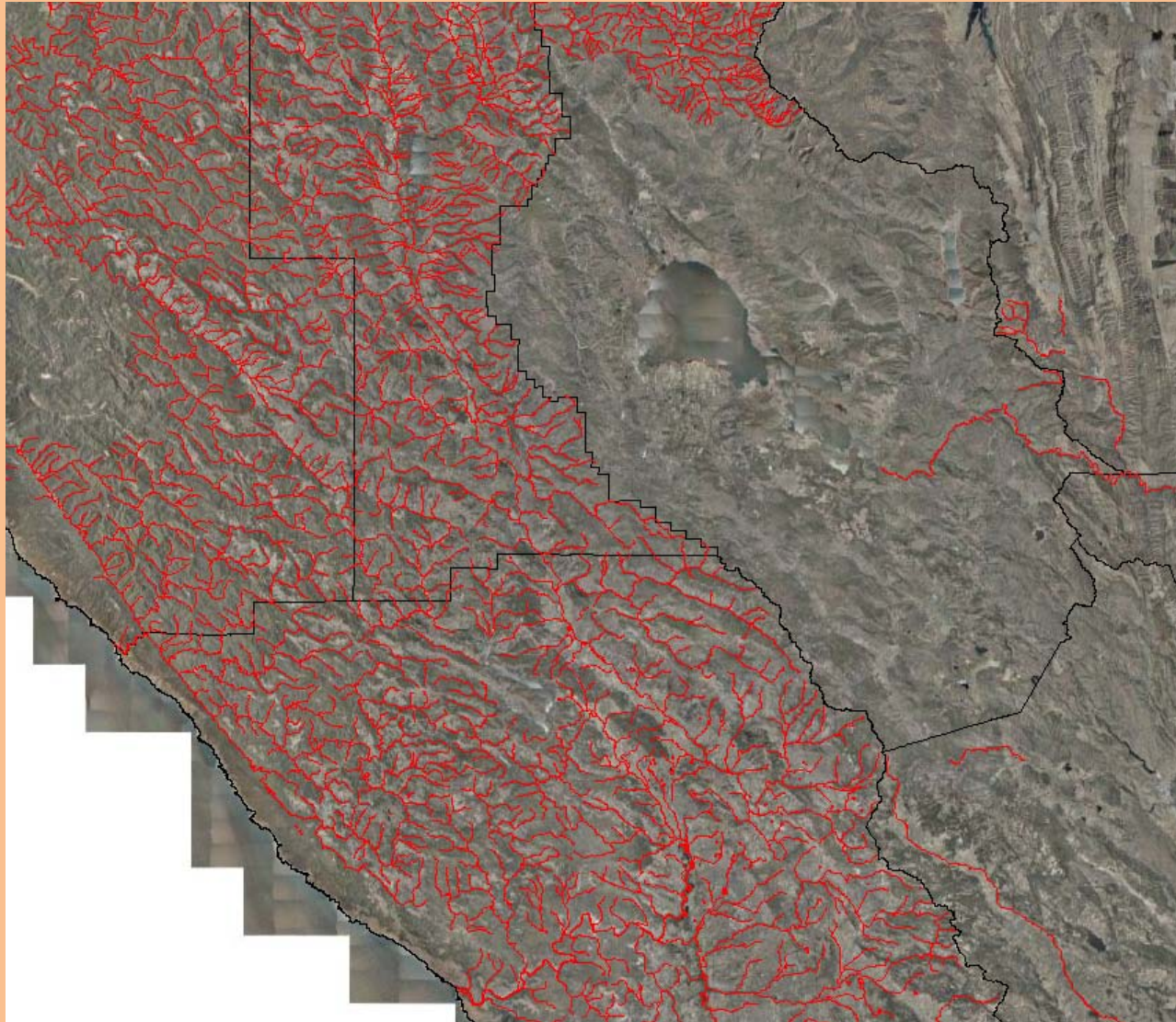
More [Web Soil Survey - Home](#)
[websoilsurvey.nrcs.usda.gov/](#)
Apr 12, 2011 – Access to **soil** survey information is provided through maps. ... Start the **Web Soil Survey application**. Welcome to **Web Soil Survey (WSS)** ...
[List of Soil Surveys by State - Official Soil Series Descriptions \(OSD\) - Requirements](#)

Davis, CA
Change location

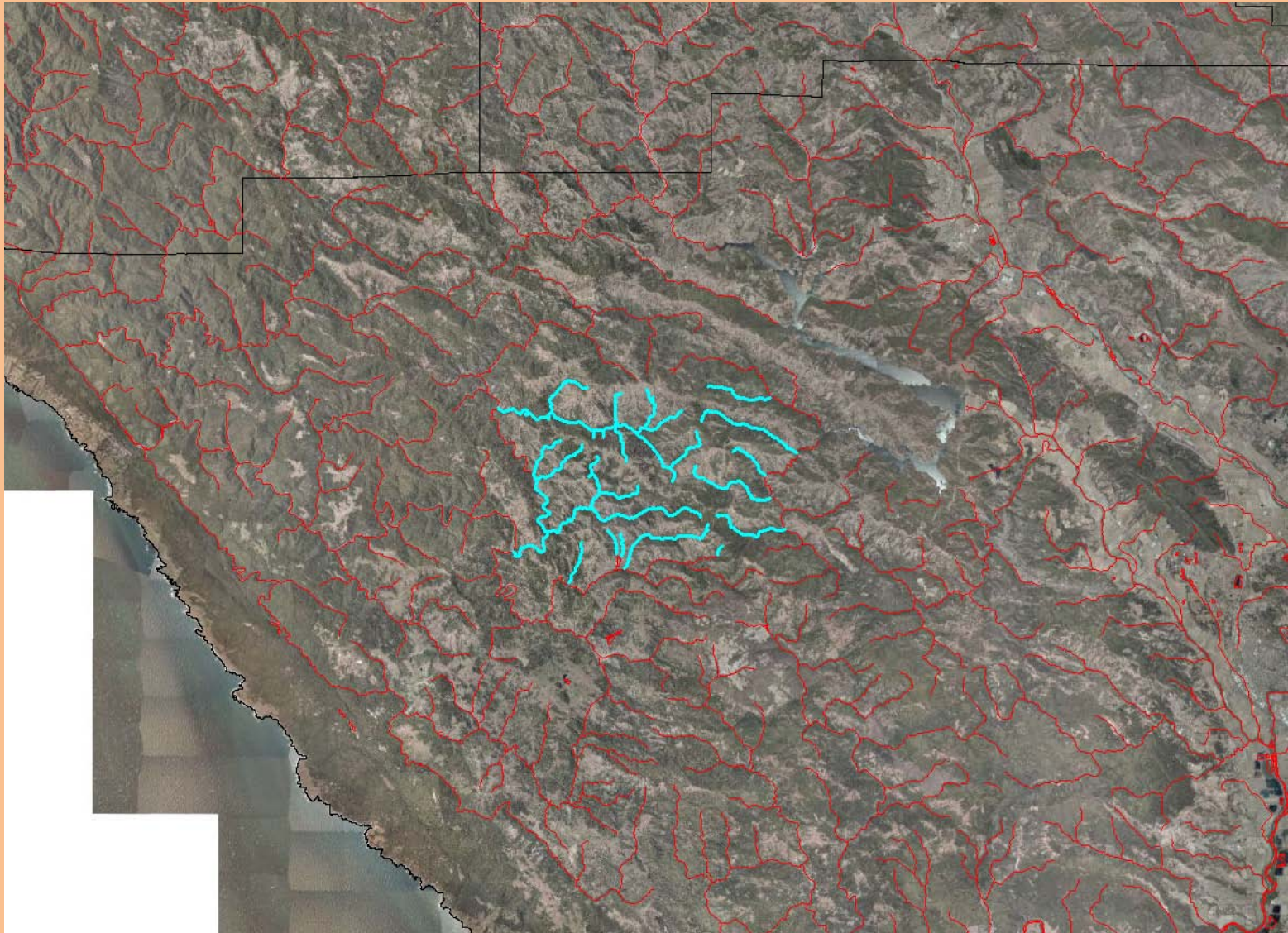
Download it off the App Store to the
Smart Phone



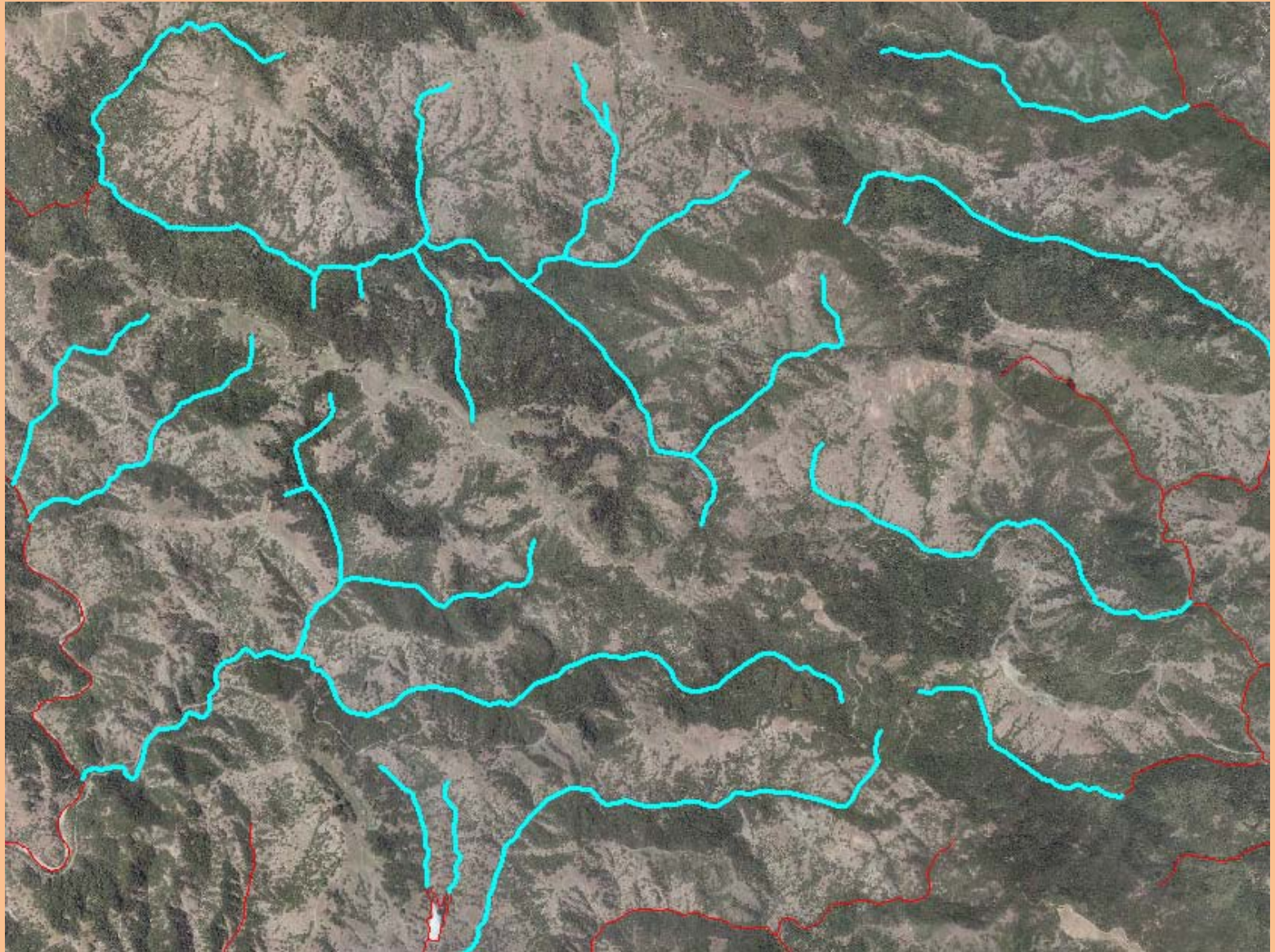
303d Stream Map- North Coast Area



Selection of some typical streams that are on the 303d List



Typical Watershed – Headwaters consisting of small seasonal creeks

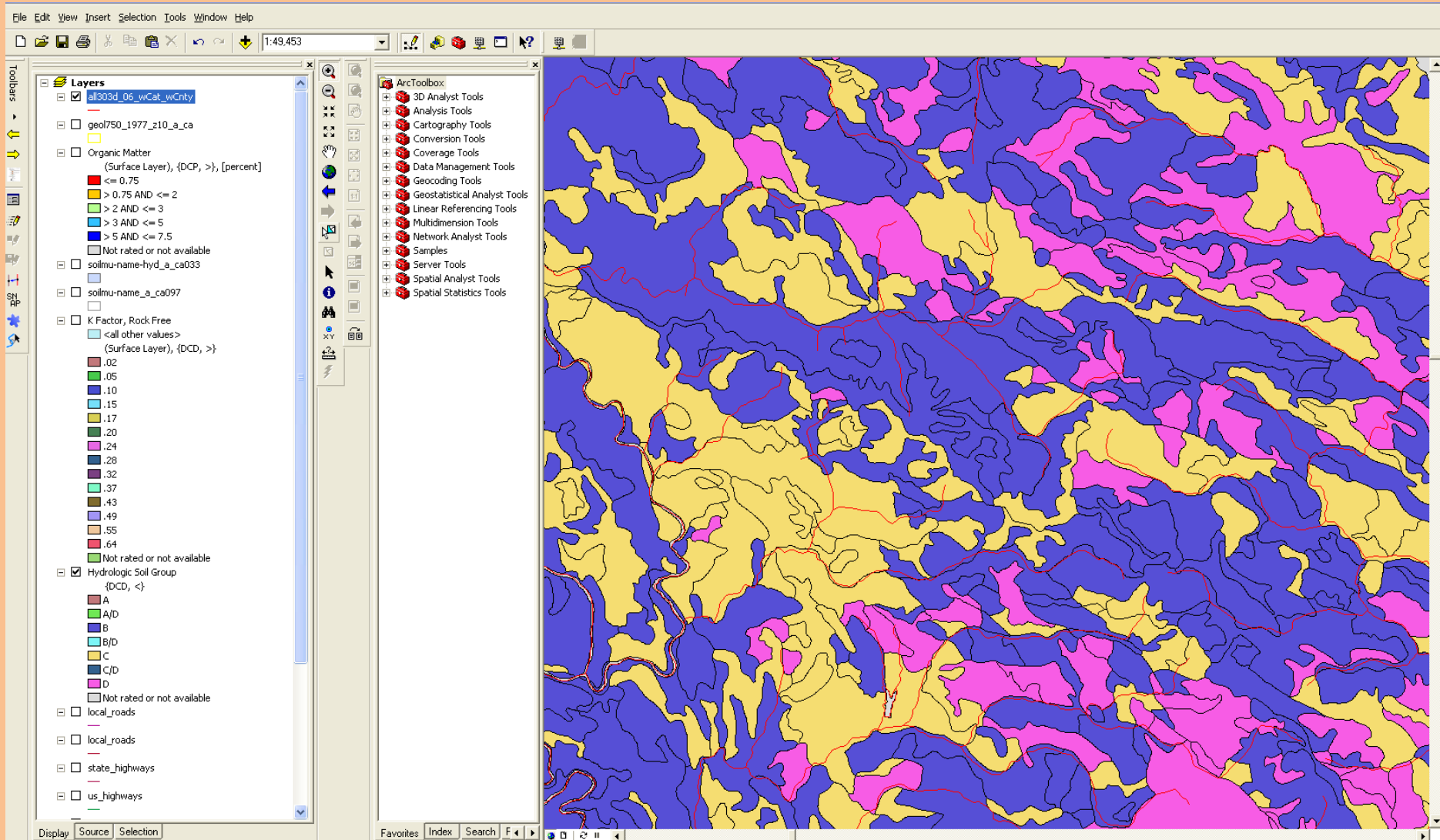


Tables showing Pollutants as Sediment; Source Construction and Development

[illegible]

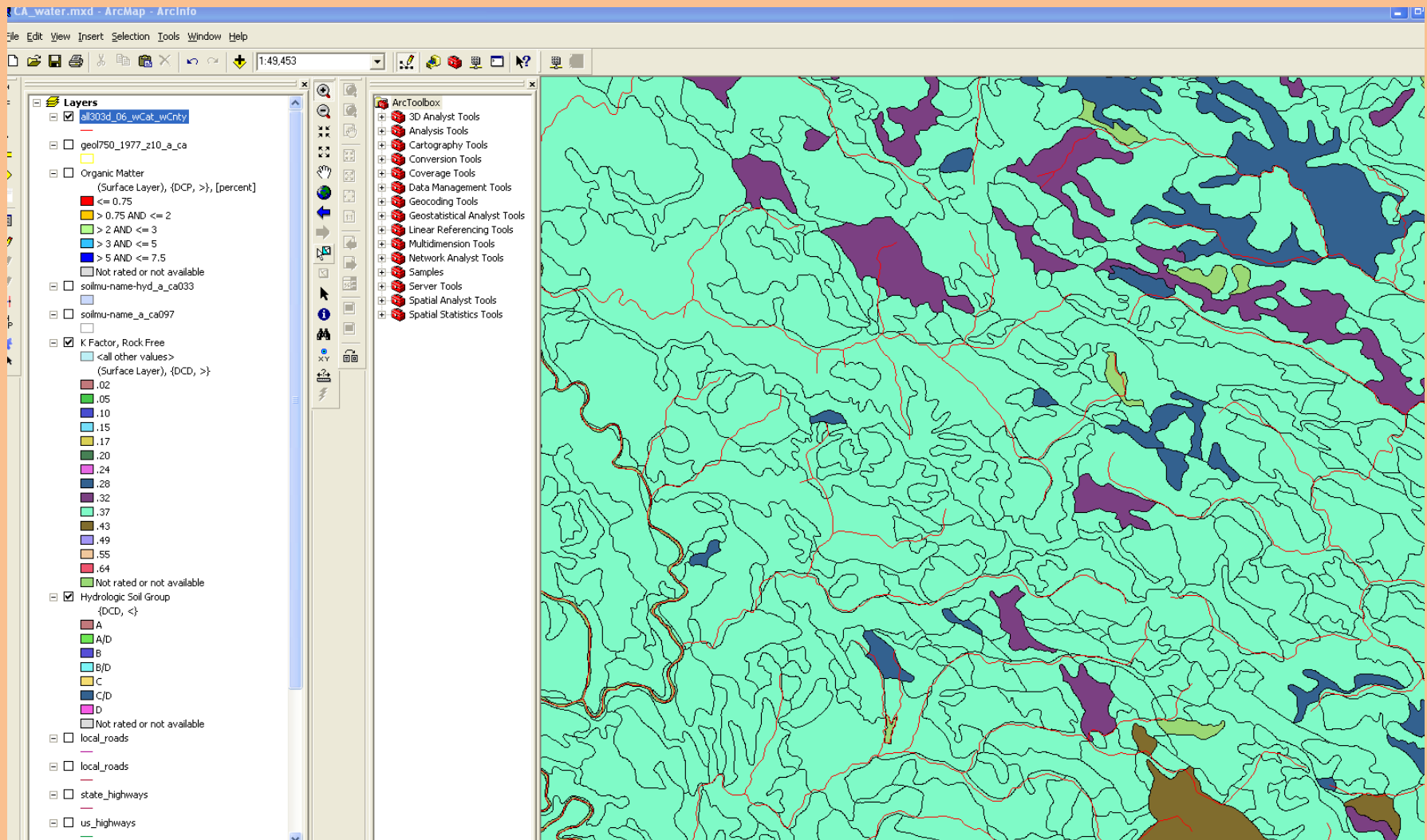
Hydrologic Soil Group

Pink = D (Slow); Yellow = C (Moderately Slow); Blue = B (Moderate)



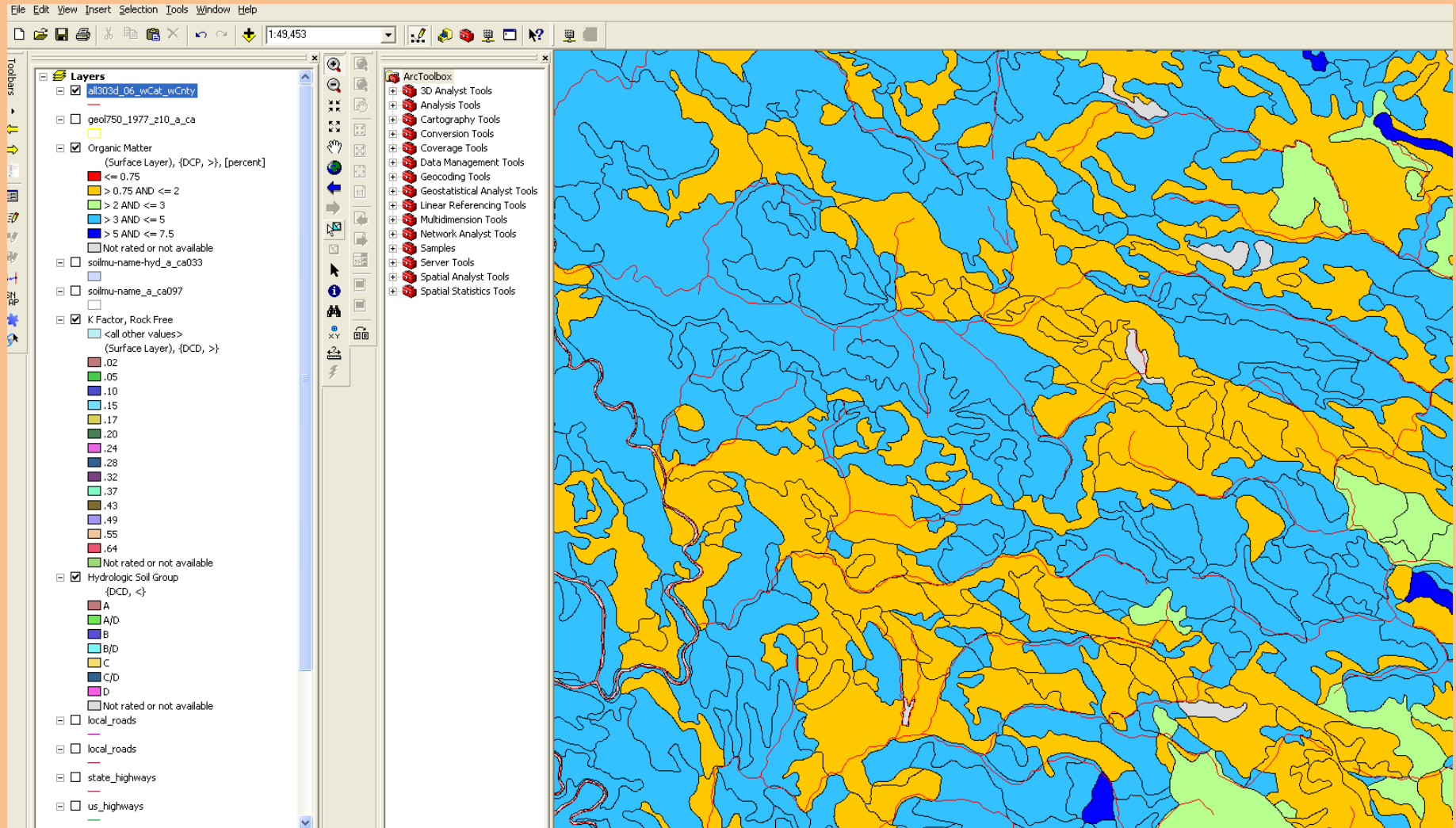
K Factor

Dominantly 0.37 (High detachability)



Organic Matter (%)

Yellow = .75 – 2 ; Lt. Blue = 3 – 5 %



Limited Area Analysis

- Moderately High to High Runoff Potential
- High K factor
- Reasonably high OM (can not be significantly increased)
 - Sediment will naturally occur in the swales
 - Focused study could predict Ton / Ac (RUSLE2)

Summary

- Sediments pulse through the system, driven primarily by major climatic events
- 'Average' or 'Mean' and lesser events are manageable
- NRCS mapping layers and data bases cover most watersheds where use is urban, ag, forestry or range
- Maps and interpretations provide prediction of infiltration, drainage, runoff and efficient water use